

REMARKS

Applicant has amended the drawings to add additional numerals to designate features shown in the drawing. Applicant has included a revised Detailed Description of the Invention to refer to the numerals. No new matter has been added. Applicant has also amended the claims to more accurately define the present invention.

Applicant's claims are direct to a method of manipulating and managing the motion and currents of a liquid cryogen utilized in the freezing or solidifying of individually small volumes of a liquid or units. The method is characterized by a series of steps. These steps include transporting the liquid cryogen in a first direction upwardly from a reservoir to a transition point where the cryogen's direction of flow changes to a second direction. The speed of travel and volume of cryogen are managed from the transition point to reduce both the gasification of the cryogen and any back eddies created in the flow of the cryogen caused by the change of direction. After the direction of flow has been changed to a second direction a liquid to be frozen by the cryogen is introduced while the cryogen is traveling in the second direction. The liquid is introduced via an orifice at a distance remote from the cryogen, such that the small volumes of the liquid form into frozen units.

The examiner has relied on United States Patent No. 4,479,363 to Gibson. The Gibson patent does not teach or suggest Applicant's invention. More specifically, Gibson has a reservoir 18 with a baffle 20 therein. See Figure 2 and 6. There is no change in the direction of flow of cryogen after it leaves the reservoir until the droplets of liquid are added to the cryogen. In applicant's claims however, there is a different process. Applicant transports liquid cryogen that is in a reservoir from the reservoir in a first direction upwardly from the reservoir to a transition point where the direction of flow of the cryogen changes to a second direction. Applicant has found that this arrangement provides significant benefits in the production of frozen units. Applicant's arrangement can be further improved by the use of a means for reducing the internal currents of the cryogen traveling in said second direction. This means is positioned prior to the introduction of the liquid to be frozen as called for in

claim 4. This arrangement is not taught or suggested by the Gibson patent. The Gibson patent also does not teach or suggest the use of augers as is provided in claim 76.

The Examiner also relies on United States Patent No. 3,228,838 to Rinfret. Rinfret has a reservoir 10 where the cryogen flows out of. The flow from the reservoir is in generally a downward direction and there is no change from the downward direction prior to the addition of the liquid to be frozen. Accordingly, this patent does not overcome the deficiencies of the Gibson patent. Rinfret also does not teach or suggest a means for reducing the internal currents of the cryogen traveling in said second direction. In applicant's claim 4 this means is positioned prior to the introduction of the liquid to be frozen. The Rinfret patent also does not teach or suggest the use of augers as is provided in claim 76.

Appolonia, United States Patent No. 5,522,227, has a reservoir 48. The cryogen flows downwardly from the top of the reservoir to the area where the liquid to be frozen is dropped into the cryogen. Milankov and Kosock also relied on by the Examiner do not teach or suggest the concept of managing the speed of travel and volume of cryogen as it travels from the transition point. Milankov and Kosock also do not appreciate that this management can reduce gasification of the cryogen and any back eddies created in the flow of said cryogen caused by said change of direction. This is particularly true in Kosock where the cryogen falls out of the opening in the tube extending from the pump. There is clearly no control of any gasification or back eddies in the arrangement shown in this patent.

CONCLUSION

For the foregoing reasons Applicant requests reconsideration and allowance of the claims of the application.

Respectfully submitted,



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CERTIFICATE OF MAILING

I hereby certify that the foregoing Response was mailed by first class mail, postage prepaid, in an envelope addressed to the Hon. Commissioner of Patents, P.O. Box 1450 Alexandria, VA 22313, this 11th day of April, 2005.